

① $a_n = 3n - 5$, find first 4 terms. ② 2, 6, 18, $\frac{54}{1}$, $\frac{162}{1}$, $\frac{486}{1}$

$$a_1 = 3(1) - 5 = -2$$

$$a_2 = 3(2) - 5 = 1$$

$$a_3 = 3(3) - 5 = 4$$

$$a_4 = 3(4) - 5 = 7$$

$$\boxed{-2, 1, 4, 7}$$

$$r = 3$$

③ $a_n = 39$, $a_1 = 225$, $d = -6$

Find n .

$$39 = 225 + (n-1)(-6)$$

$$39 = 225 - 6n + 6$$

$$39 = -6n + 231$$

$$-192 = -6n$$

$$\boxed{32 = n}$$

④ $a_{17} = 111$, $a_{28} = 199$

Find d .

$$d = \frac{199 - 111}{28 - 17} = \frac{88}{11} = \boxed{8}$$

⑤ $a_5 = 48$, $a_8 = 384$

Find r .

$$r = \frac{384}{48} = \sqrt[8-5]{8} = \boxed{2}$$

⑥ -1, 2, 5, 8, 11, ...

$$\text{Recursive: } a_1 = -1$$
$$a_n = a_{n-1} + 3$$

⑦ 3, 6, 12, 24, ...

$$\text{Recursive: } a_1 = 3$$

$$a_n = 2a_{n-1}$$

⑧ $1 + 2 + 4 + 8 + \dots$
 $r = 2$, $n = 10$. Find 10th partial sum

$$S_{10} = 1 \left(\frac{1 - (2)^{10}}{1 - 2} \right)$$

$$\boxed{S_{10} = 1023}$$

$$\textcircled{9} \sum_{n=1}^{22} (5n-11) = \boxed{1023}$$

* plug in calculator
OR

$$S_n = \frac{n}{2} (a_1 + a_n)$$

$$a_1 = 5(1) - 11 = -6$$

$$a_n = 5(22) - 11 = 99$$

$$S_{22} = \frac{22}{2} (-6 + 99)$$

$$\boxed{S_{22} = 1023}$$

$$\textcircled{11} \sum_{n=1}^8 5(3)^{n-1} = \boxed{16,400}$$

* plug in cal.
OR

$$S_n = a_1 \left(\frac{1-r^n}{1-r} \right)$$

$$S_8 = 5 \left(\frac{1-(3)^8}{1-3} \right)$$

$$\boxed{S_8 = 16,400}$$

$$\textcircled{10} 2 + 5 + 8 + 11 + \dots$$

$d = 3 \quad n = 12$. Find 12th partial sum

$$S_{12} = \frac{12}{2} (2(2) + (12-1)3)$$

$$\boxed{S_{12} = 222}$$

$$\textcircled{12} \sum_{n=1}^{\infty} 18 \left(\frac{1}{2} \right)^{n-1}$$

$$S = \frac{18}{1 - \frac{1}{2}}$$

$$\boxed{S = 36}$$

$$\textcircled{13} 5 + 7 + 9 + 11 + \dots + 33$$

$$d = 2$$

$$a_n = 5 + (n-1)2$$

$$a_n = 5 + 2n - 2$$

$$a_n = 2n + 3$$

$$\boxed{\sum_{n=1}^{15} (2n+3)}$$

$$\textcircled{14} 2 + 6 + 18 + \dots + 1458$$

$$r = 3$$

$$\boxed{\sum_{n=1}^7 2(3)^{n-1}}$$

$$\textcircled{15} \sum_{n=11}^{55} (3n-8) = \boxed{4095}$$

* plug in cal.

OR

$$S_n = \frac{n}{2}(a_1 + a_n)$$

$$a_1 = 3(11) - 8 = 25$$

$$a_n = 3(55) - 8 = 157$$

$$n = 55 - 11 + 1 = 45$$

$$S_{45} = \frac{45}{2}(25 + 157)$$

$$\boxed{S_{45} = 4095}$$

$$\textcircled{17} \sum_{n=1}^{\infty} (3-5n)$$

Not possible

Heading towards
 $-\infty$

$$\textcircled{19} a_1 = 30, d = 4, n = 25$$

$$S_{25} = \frac{25}{2}(2(30) + (25-1)4)$$

$$\boxed{S_{25} = 1950 \text{ seats}}$$

$$\textcircled{16} a_1 = 2, S_n = 682, r = 4$$

Find a_n

$$682 = \frac{2 - a_n(4)}{1 - 4}$$

$$-3(682) = \frac{2 - 4a_n}{-3} - 3$$

$$-2046 = 2 - 4a_n$$

$$-2048 = -4a_n$$

$$\boxed{512 = a_n}$$